Bald Eagle

HABITAT MGMT. GUIDELINES

U.S. FOREST SERVICE - CALIFORNIA REGION

Preface

This publication discusses guidelines for managing Bald Eagle nesting and wintering habitats. These guidelines are aimed primarily at coordinating land use activities under the multiple use concept of the U. S. Forest Service. However, other federal or state agencies, groups or persons may find this publication helpful in meeting the requirements of the establishment of critical habitat for Bald Eagles under the Endangered Species Act of 1973. Copies are available from:

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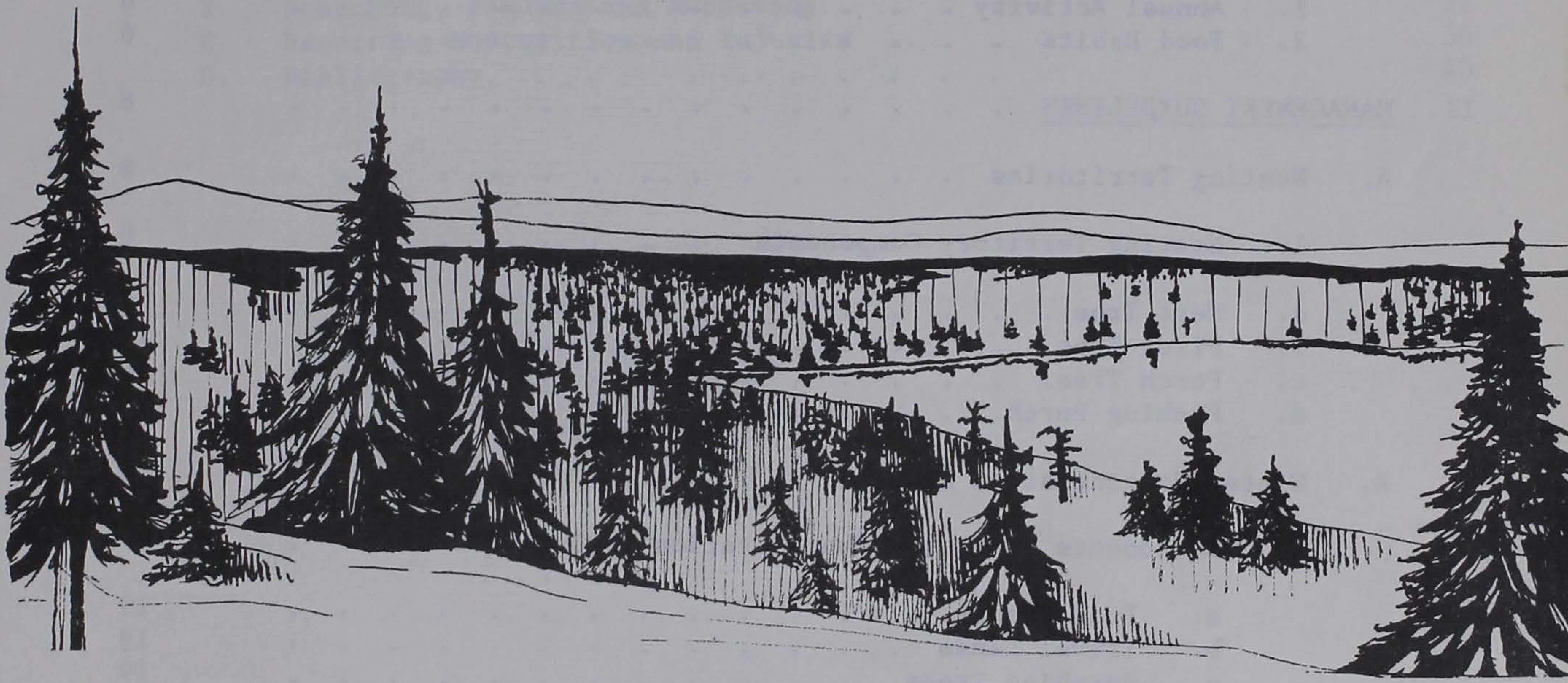

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I. BACKGROUND INFORMATION.

A. Distribution, Status, Trend, Legislation.

North America is the only place in the world where bald eagles (Haliaeetus leucocephalus) occur. They are found primarily along the coasts, inland lakes and rivers from the Gulf of Mexico to the Arctic. Historical and present distributions are essentially the same, but the numbers of Bald Eagles in the Continental United States are reduced from former abundance.

Most known populations in the contiguous United States are generally decreasing. In response to this decline the southern race of bald eagles was declared an endangered species on March 11, 1967. The biological basis for differentiation between the northern and southern subspecies is controversial. The Fish and Wildlife Service is considering a proposal to declare all bald eagles in the contiguous United States as endangered or threatened.

Many states protect bald eagles under their State Endangered Species Act. Pursuant to the California Endangered Species Act of 1970 the Fish and Game Commission declared the southern bald eagle as endangered. All resident bald eagles in California are considered endangered by California Department of Fish and Game.

In addition to total numbers, productiion of young is used as a measure of population status. In California as of 1974, there were 35 identified nesting territories in nine counties on both public and private land. In 1974 only 21 of the 35 were occupied, i.e., breeding pairs present in territory. Eighteen of the 21 were checked for success, and produced 17 young eagles. This is a ratio of 0.94 young per occupied nest; in 1972 it was 1.20; in 1973 it was 1.26. Many experts feel that 0.7 young per occupied nest is the absolute minimum needed to maintain the present population.

The U.S. Bald Eagle Act of 1940 provided protection to the birds themselves. From 1940 until recently, bald eagle habitat was managed in accord with general land management direction. With the passage of the Endangered Species Act of 1973, habitat as well is given protection. Section two of Public Law 93-205 states that "the purposes of this Act is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved ---". "It is further declared to be the policy of Congress that all Federal Departments and Agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of this Act."

B. Factors Causing Decline.

A detailed discussion of limiting factors can be found in many of the publications in the literature cited section. The ones most commonly mentioned are shooting, logging, severe weather, land use change, increased human pressure on eagle habitat, industrial pollution, siltation, acid waste and pesticides.

The catastrophic declines seen in the past are thought to be primarily due to pesticides. The long term effect on Bald Eagles by pesticides is lowered productivity. When productivity is reduced all factors become important.

C. Description.

The Bald Eagle is a large soaring bird second in size only to the California Condor in North America. It has a body length of 32 inches and a wing span of about seven feet. Bald Eagles weigh from 10 to 15 pounds. Body size varies with latitude. Northern Bald Eagles are slightly larger.

D. Field Identification.

Adult Bald Eagles of both sexes display the striking white head and tail. Sex can only be distinguished by in-the-hand examination by an expert. Females are slightly larger than males, as is the case with most raptors. The soaring flight is stable and deliberate. Wing flapping is fairly rapid, regular and measured. Adult Bald Eagles can be distinguished at a distance of several miles with binoculars or spotting scope. While adult Bald and Golden Eagles (Figures 1 and 2) are easily distinguished, immature Bald Eagles lacking the white head and tail can be confused with Golden Eagles (Figure 3).

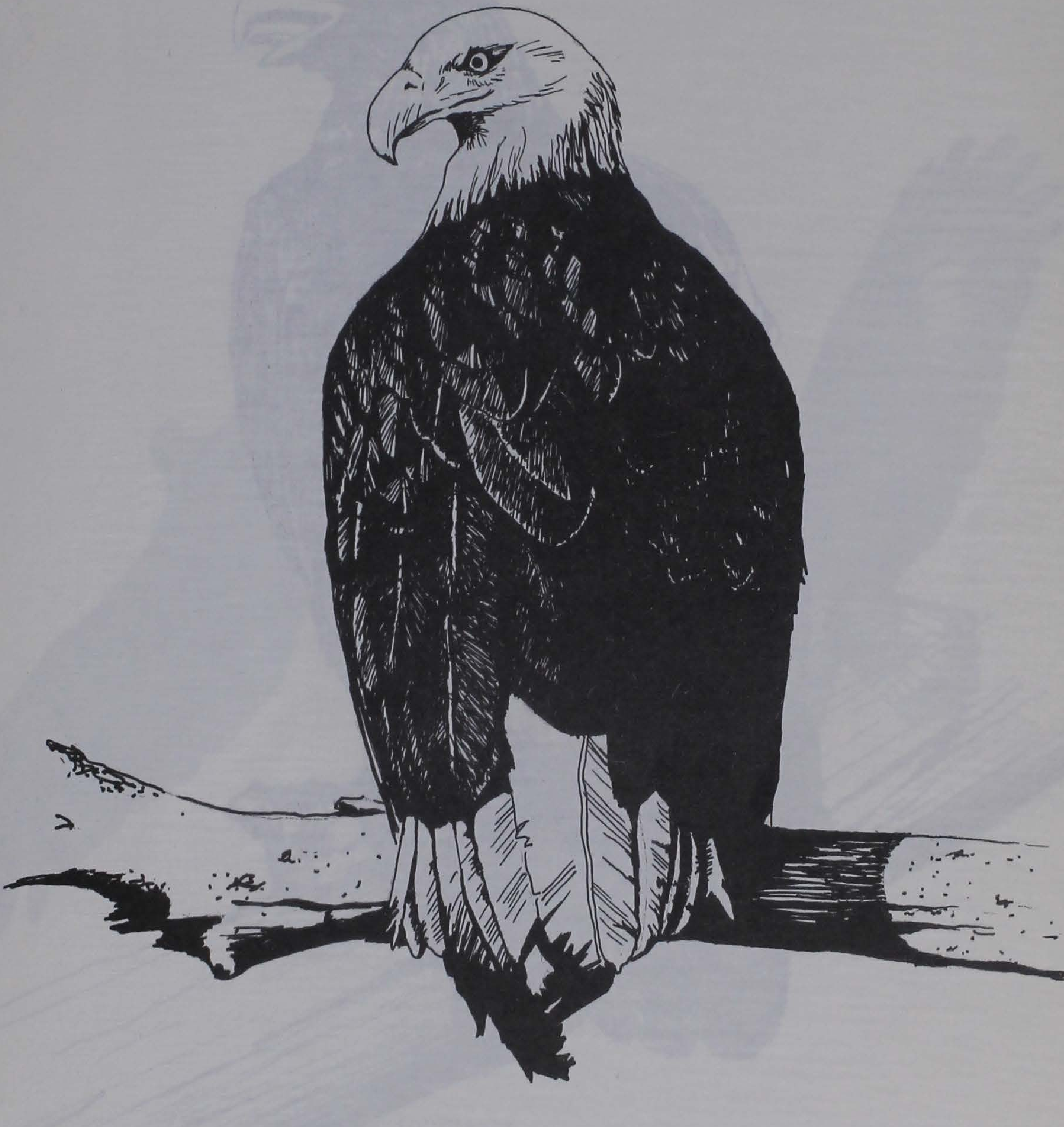


Figure 1- Adult Bald Eagle

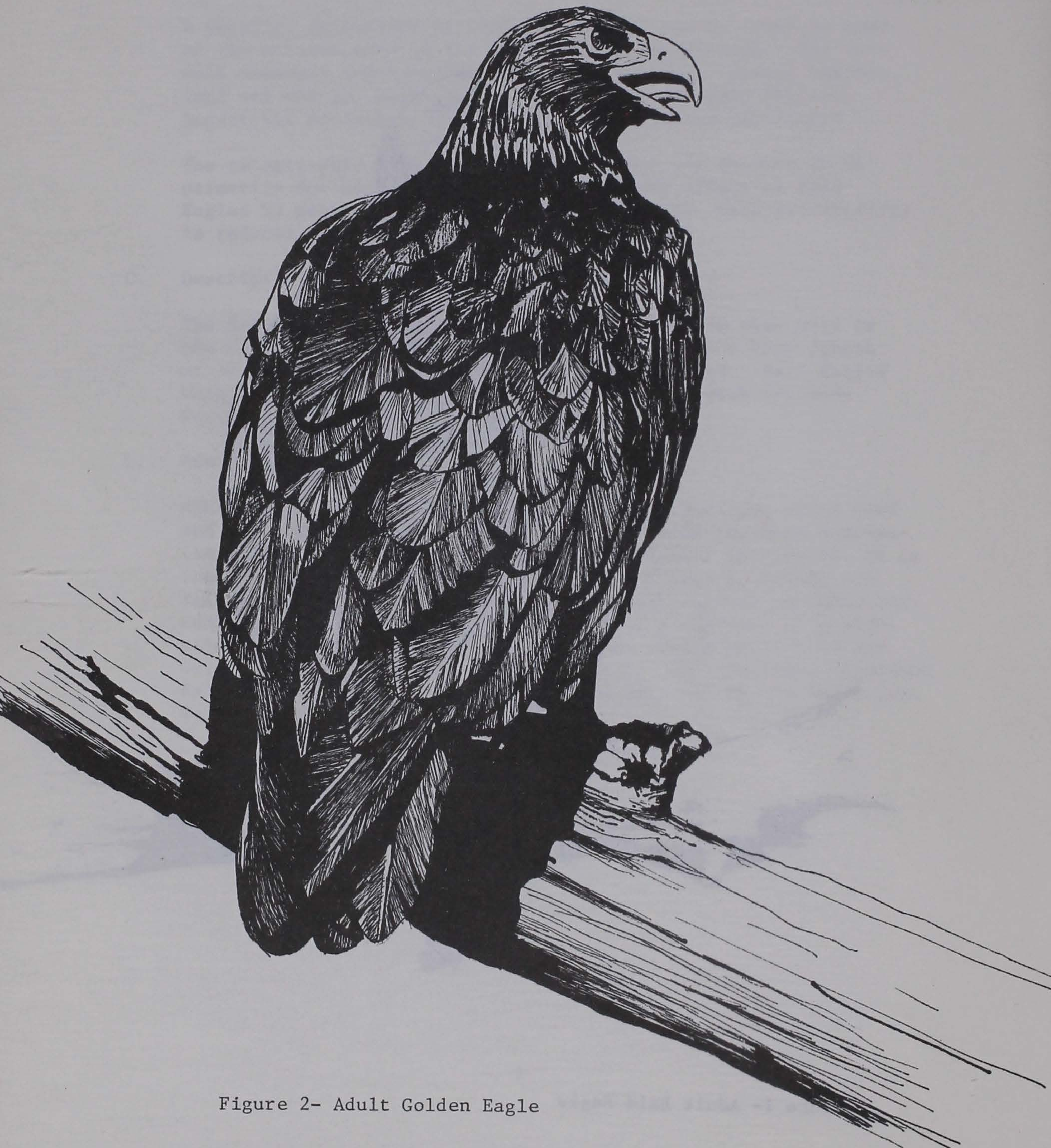
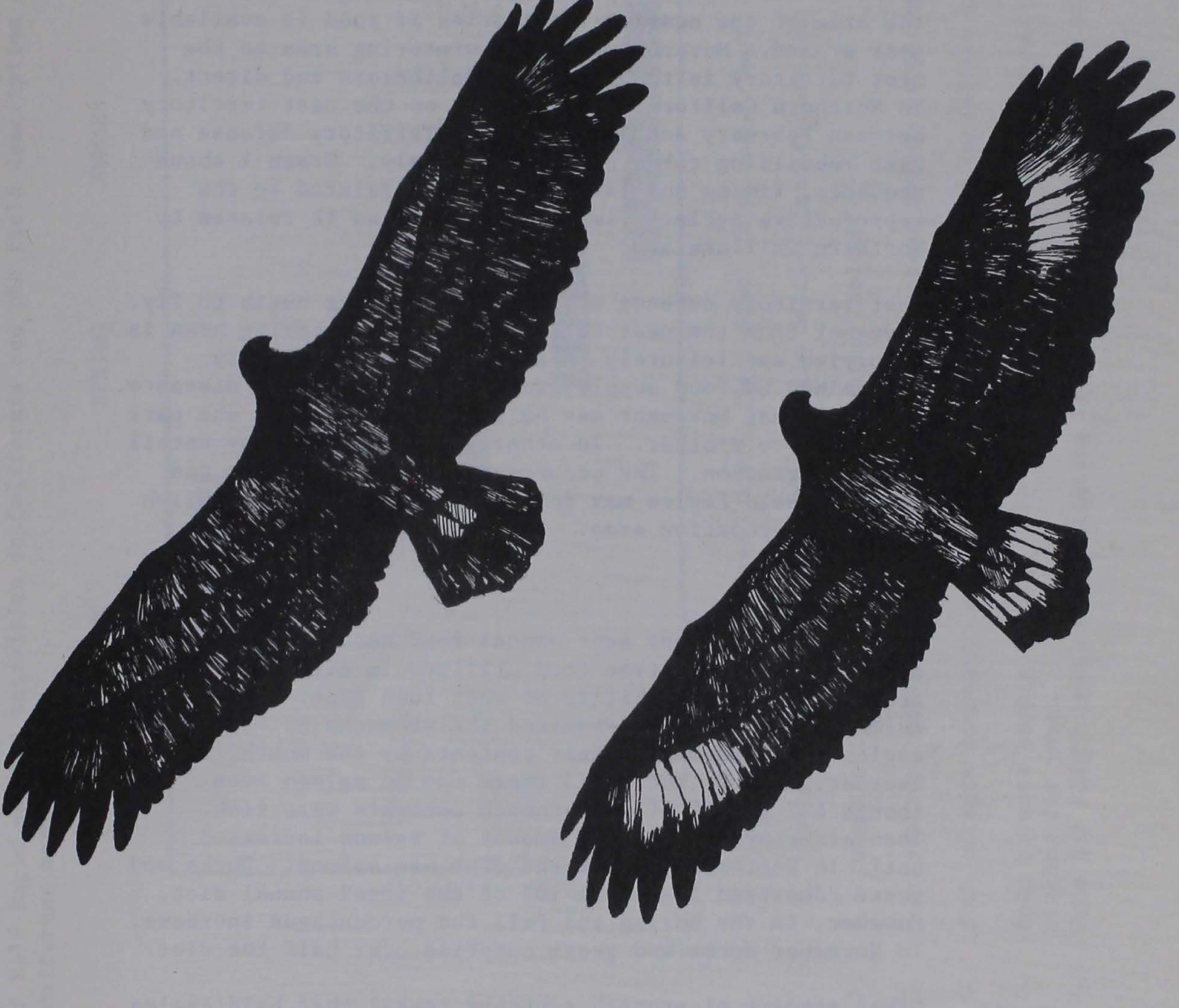


Figure 2- Adult Golden Eagle

Figure 3. Comparison of juvenile Bald and Golden Eagles as viewed in flight from below.



Viewed in Flight

Bald Eagle juvenile	Golden Eagle juvenile
1. No distinct white patches; extremely variable patterns of brown and white mottling throughout wing.	1. Characteristic white patches at base of primaries.
2. Tail mottled brown and white.	2. Tail white with dark terminal band.

E. Life History.

1. Annual Activity.

Breeding bald eagles are thought to form a pair bond for life. These are almost always adult birds. During a typical year they are on the wintering area until just prior to the reproductive cycle. Some eagles remain in the area of the nesting territories if food is available year around. Movement from the wintering area to the nest territory is thought to be deliberate and direct. In Northern California they arrive on the nest territory between February and early March. Territory defense and nest rebuilding takes place immediately. Graph I shows sequence, timing and length of events related to the reproductive cycle. Timing is general as it relates to Northern California.

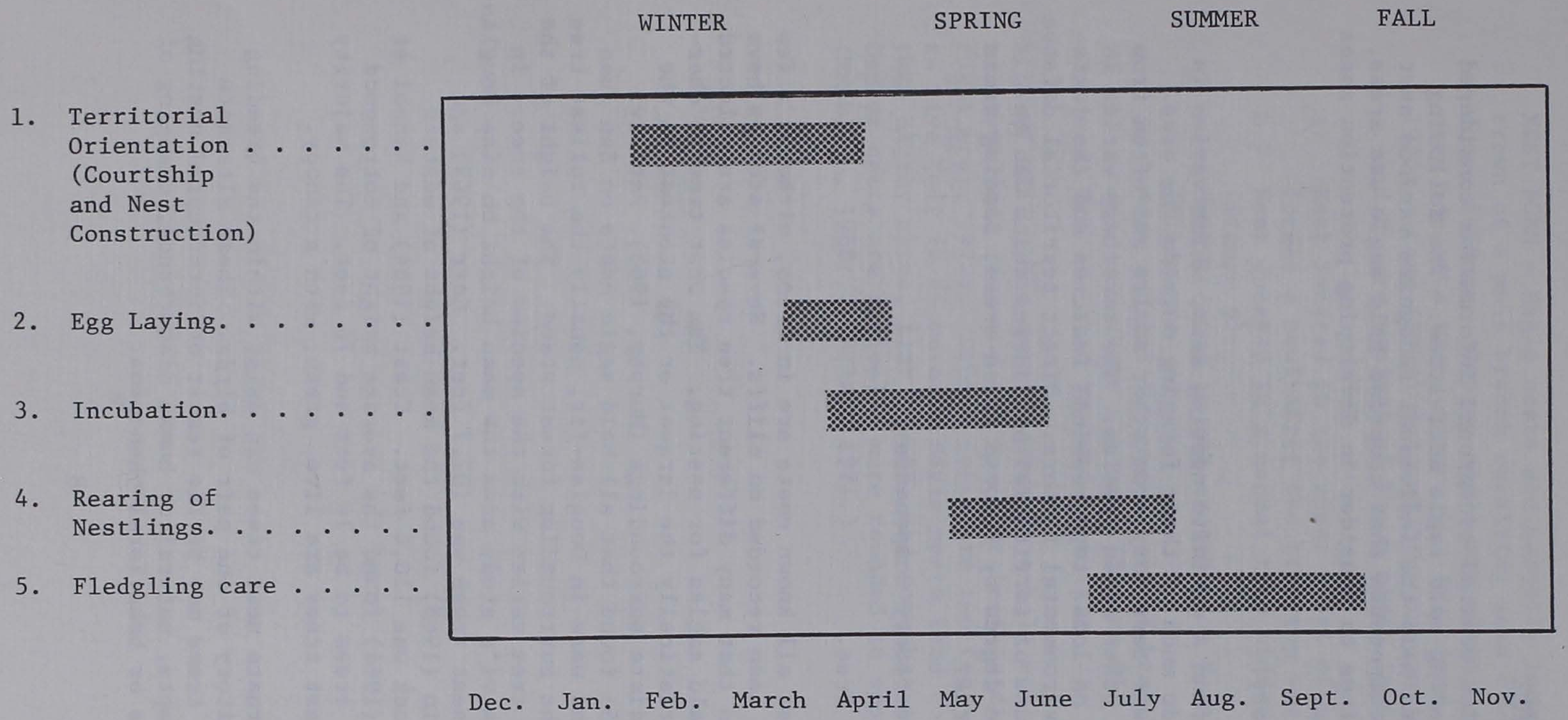
Nest territory defense stops when the young begin to fly. Movement from the nest territory to the wintering area is unhurried and leisurely. Fall movement is probably determined by food supply, weather and migration distance. In some areas movement may be very short or from one part of a lake to another. In other areas movement may entail a long migration. The occurrence of several adult and immature Bald Eagles may indicate a winter concentration feeding or roosting area.

2. Food Habits.

With some exceptions most annual food needs come from or around water. The type food utilized is directly proportional to the availability of that food type. In Alaska Kalmbach et al (1964) examined the stomachs of 435 bald eagles and determined their contents by the month. In February, March, and April there was no salmon even though 60% to 75% of the stomach contents were fish. Then starting in June the amount of salmon increased until in September 85% of the diet was salmon. Ducks and geese comprised less than 10% of the total annual diet. However, in the spring and fall the percentages increase. In November ducks and geese comprise over half the diet.

Other studies of stomach contents reveal that bald eagles take and eat what is in plentiful supply. Along coastal Maryland and Virginia fish and water birds comprise 85% of Bald eagles' diet (Imler and Kalmbach 1955). Near Chesapeake Bay in Maryland over three-fourths of the food used was fish water birds and mammals such as muskrat. Smith (1936), Imler (1934) in Utah and Edwards (1969) in Utah found wintering bald eagles subsisting on jackrabbits. Coffey (1976), finds wintering eagles in Southern California use waterfowl primarily.

Graph 1 - Sequence of Bald Eagle nesting activities in California and the field description used to determine different activities.



Sequence of activities in Bald Eagle nesting territories for California

1. ♀ arranges sticks on nest; both sexes gather sticks
2. ♀ on nest exclusively; ♂ will visit but no apparent switch of parents on nest
3. Both parents incubate; switch of adults daily thru the incubation period
4. Both parents supply food; ♀ more in attendance at nest; ♂ does most of the fishing for young
5. From 1st flight until disassociation from nest. Both parents in attendance.

II. MANAGEMENT GUIDELINES.

The preceeding section covered background information considered helpful in understanding bald eagle activities. The following section is written to help the individual recognize various nest and winter habitat components that comprise bald eagle use areas, and presents guidelines to consider in developing protection zones and management plans.

A. Nesting Territory.

Bald eagles defend a definite nesting area, which varies in size, but may do much of their foraging outside the area. They defend their territory from other adults and often from sub-adults and other avian species. The territory varies in size depending on local topographical features and the juxtaposition of environmental factors. Direct territorial defense is a good measure of territorial boundaries which can be defined to some degree by favored perch trees, resting areas and the nest tree.

1. Nesting Territory Components.

a. Nest Tree.

Almost all known nests are in trees, although a few have been recorded on cliffs. Several studies have shown that many different tree species are selected by bald eagles for nesting. The nest tree is characteristically the largest or the stoutest in the immediate surroundings (Murphy, 1965). Retfalvi (1965) found that all bald eagle nests on San Juan island were in Douglas-fir, usually the tallest tree of the surrounding forest stand. The height of the nest tree varies with the species of the tree. In Retfalvi's study area the mean height on nine Douglas-fir nest trees was 102.7 feet. Corr (1969) and Poulin (1968) found the mean height of western hemlock was 110.4 feet. Crest (1964) and Hensel et al. (1964) found the average height of cottonwood nest trees to be 74 feet and 76 feet. The majority of nest trees are live, green, with a canopy.

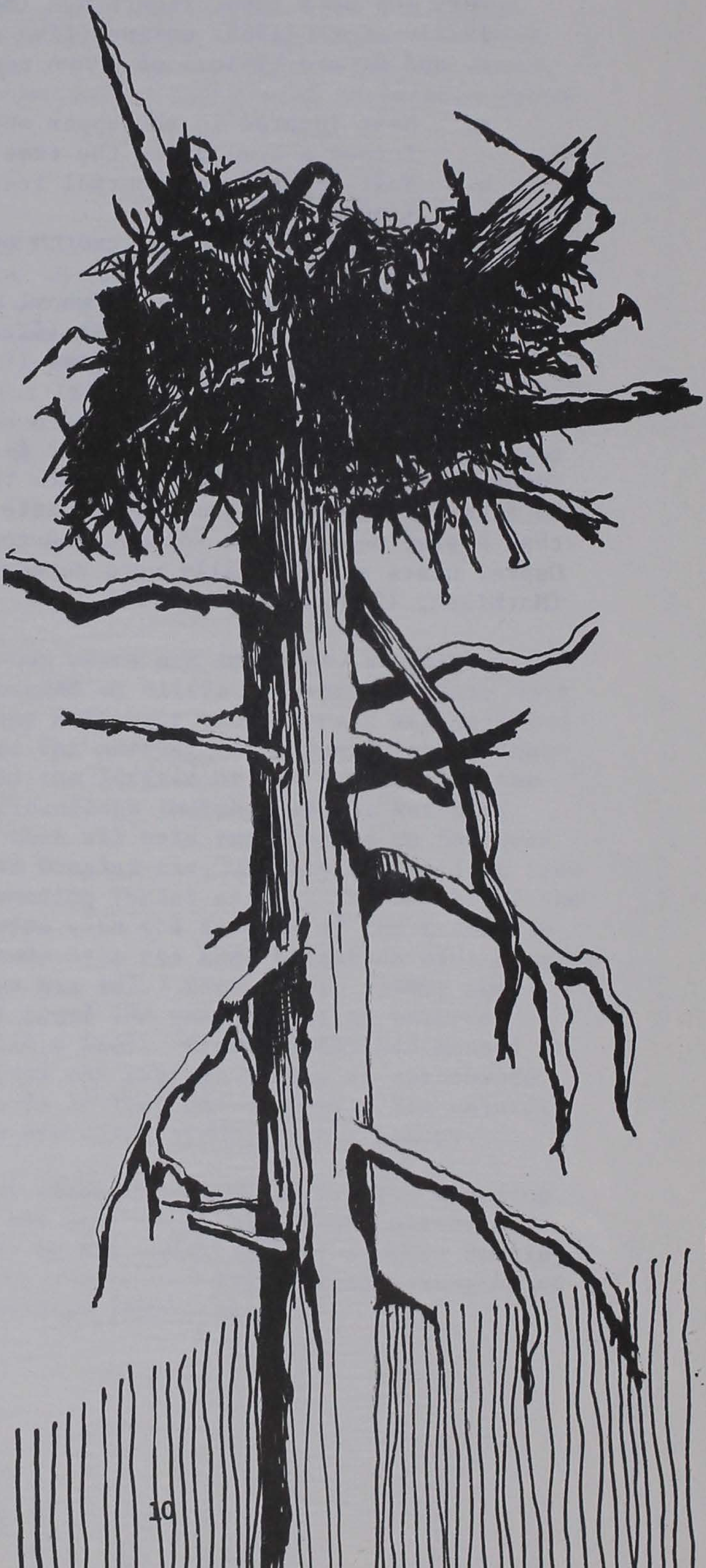
Alternate nest trees can exist within the breeding territory of one pair of birds. These alternate nest trees may be the result of interrupted nesting attempts, natural or human disturbance, changing of mates or behavioral phenomena.

NEST FORM - Eagle nests are ussually located below the crown of a main branch receiving some cover from the above foliage. Osprey nests are often located at the very top of a tree, figure 4. (Mathisen, 1968; Weschler, 1971). Corr (1969) defined five categories of nest form. a. and b. are typical of known nests in California:

a. Nest located in the upper whorl of branches which formed a bowl after the tree top was damaged (figure 5).
b. Nest located in a normal tree hidden by foliage (figure 6).
c. Nest located in the crotch of a U-shaped branch (figure 7).
d. Nest located in upper whorl of branches with the dead top above the nest (figure 8).
e. Nest located in dead tree (fig. 7).

SIZE OF NEST - The average size of a bald eagle nest is five to seven feet deep and six to eight feet in diameter (USDA etal, 1972). Osprey nests are two feet deep and four to five feet in diameter. Eagle nests tend to be larger than osprey nests, flat topped, and somewhat cone shaped. Osprey nests are basically more rounded in appearance. (Mathisen, 1968; Wechsler, 1971.)

Figure 4- Typical Osprey Nest



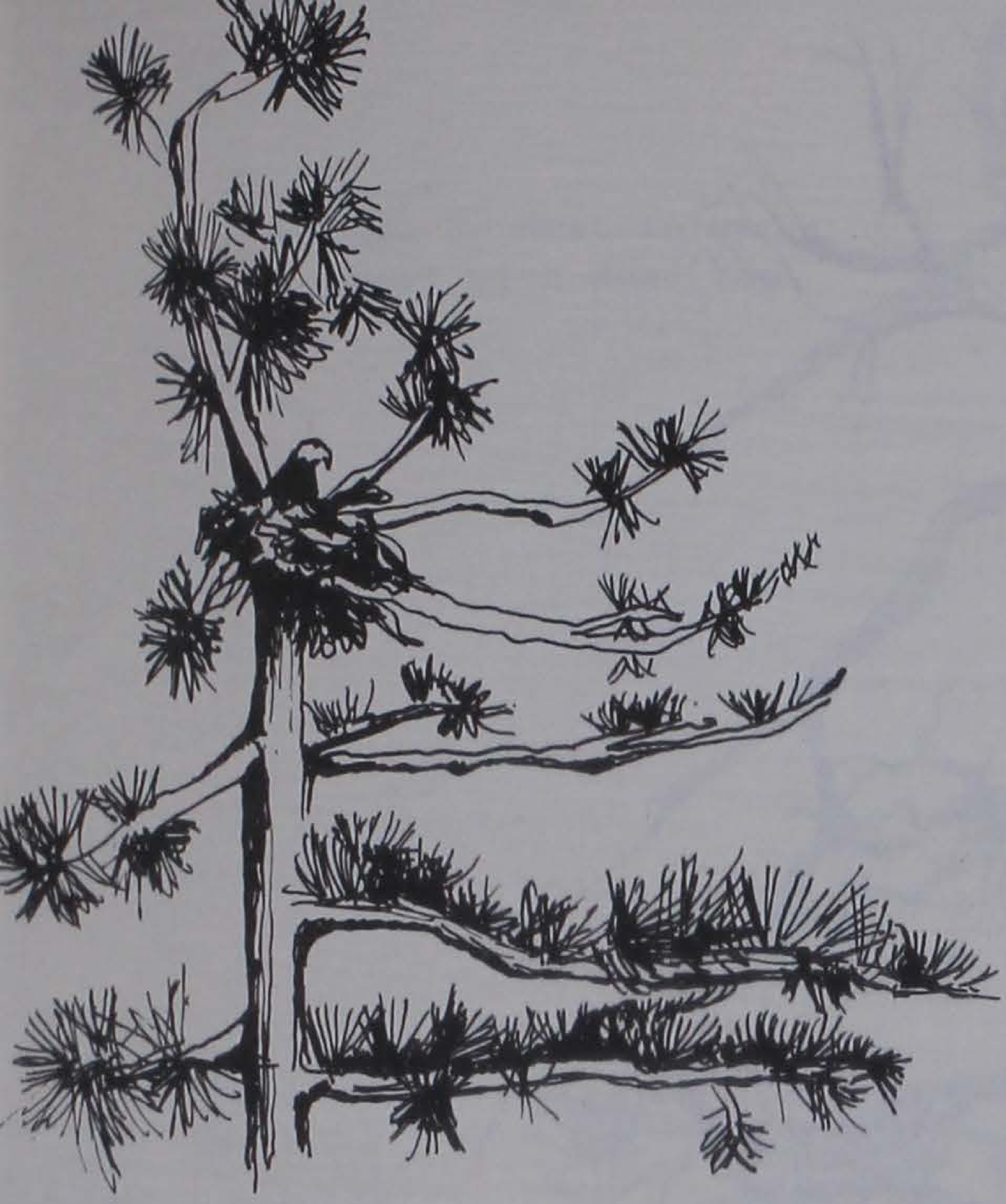
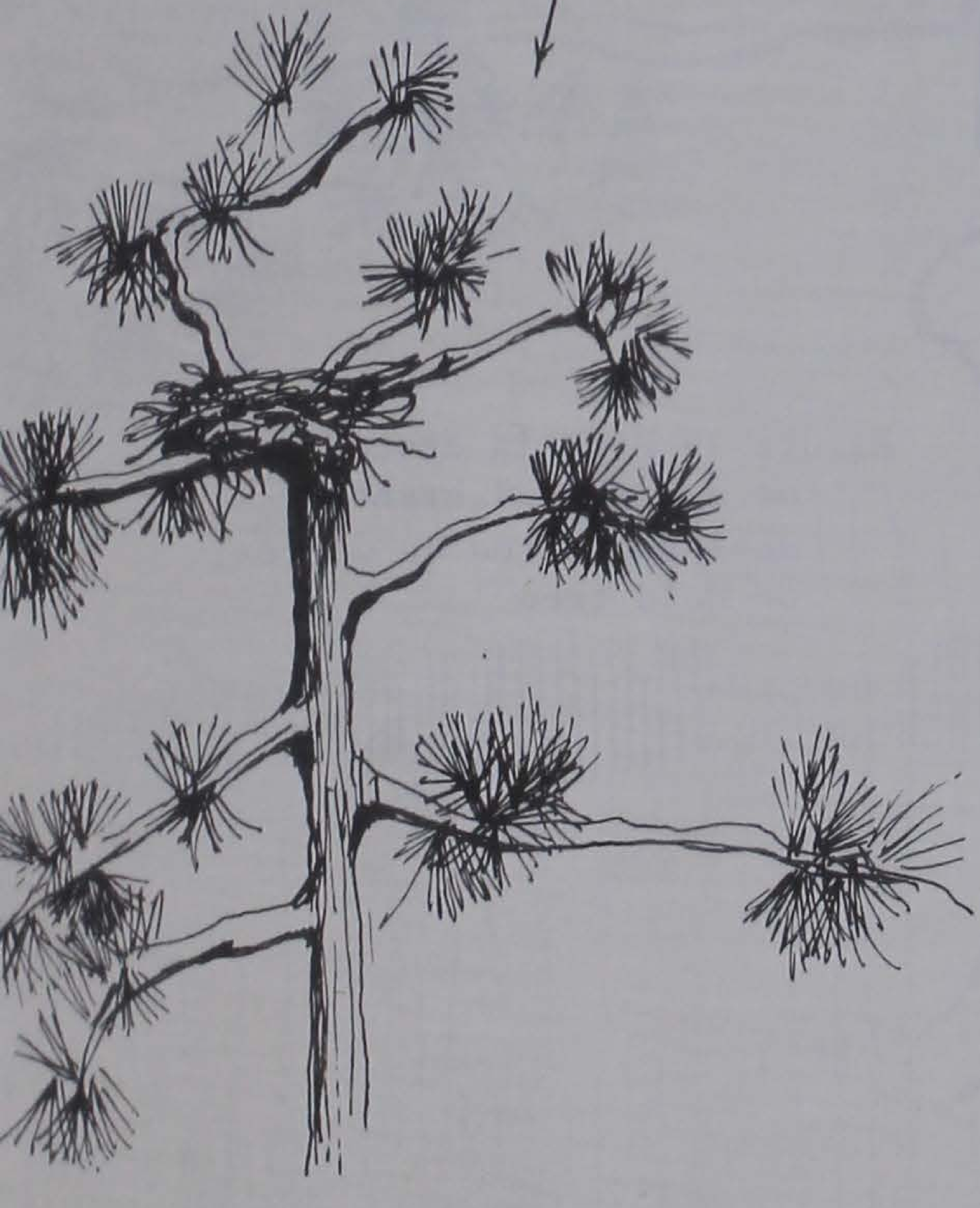


Figure 5- Nest in bowl formed after tree top was damaged.



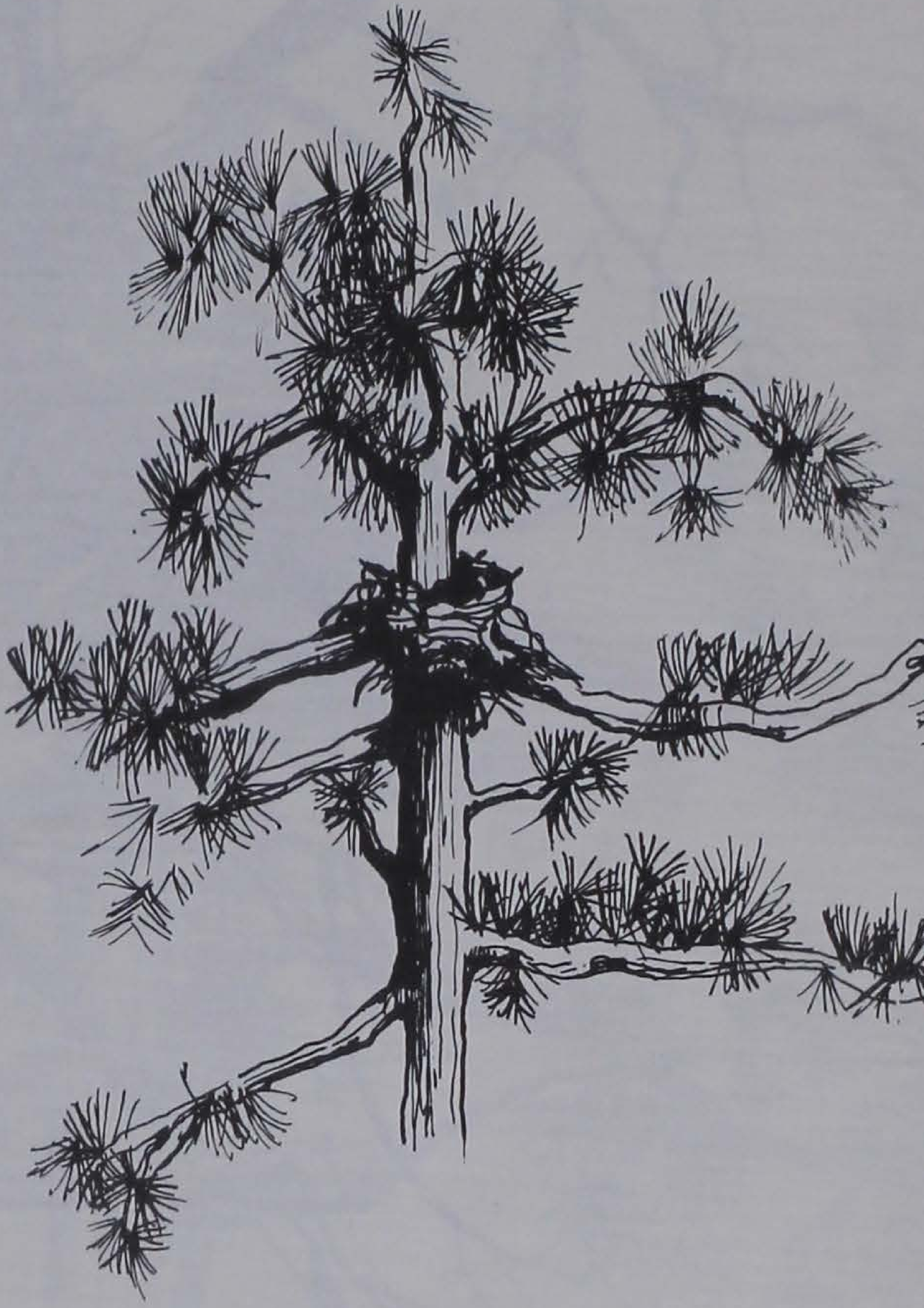


Figure 6- Nest in normal tree, hidden by foliage.

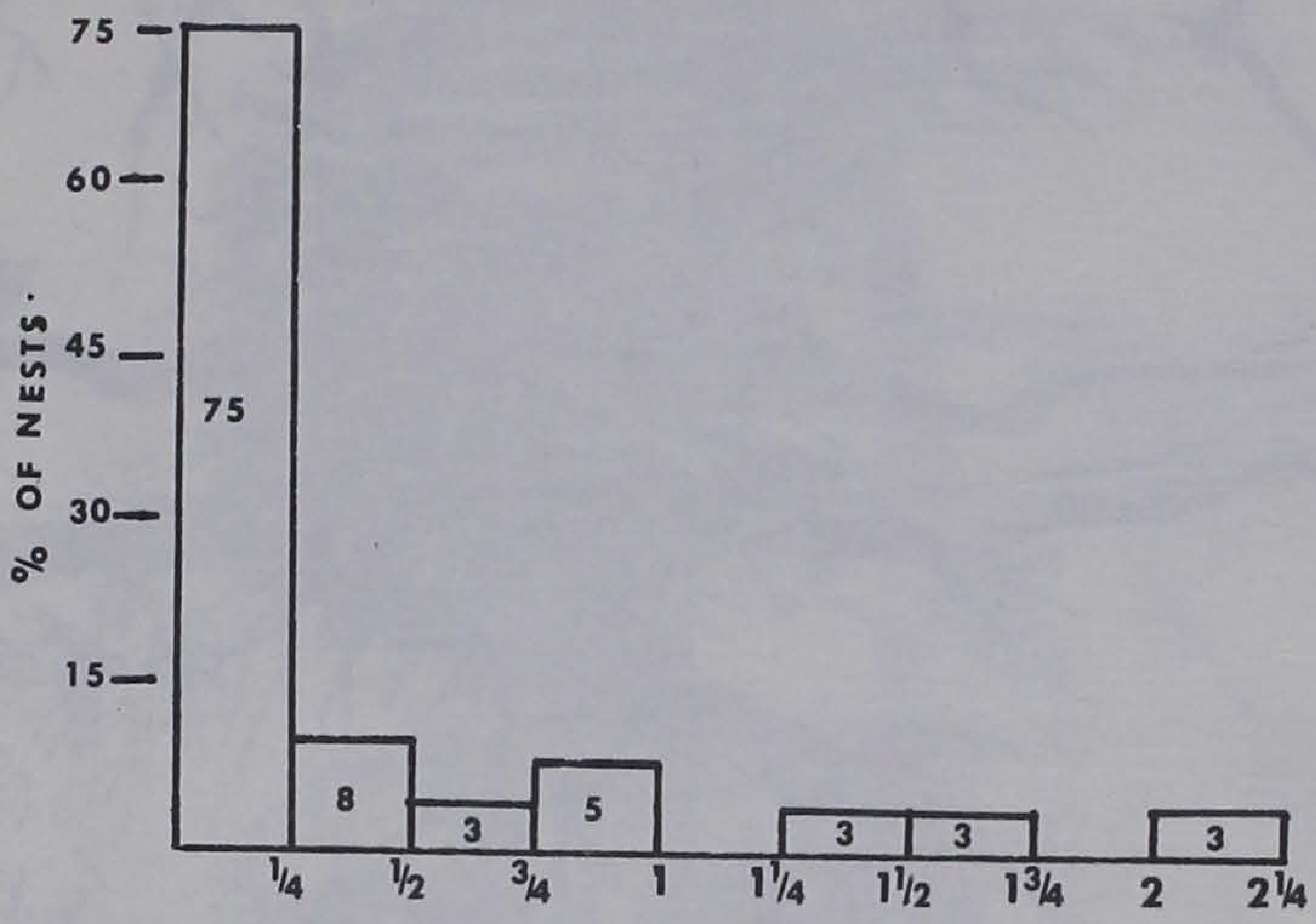
Figure 7- Nest in crotch of a U-shaped branch - deciduous tree in winter, or dead tree

Figure 8- Nest in upper whorl with dead top.

DISTANCE OF NEST TREE FROM WATER - The primary diet of bald eagles during the breeding season is fish. For this reason nesting territories are usually found near water (lakes, rivers, reservoirs, marshes, fresh water inlets and small confined bays).

In California, Thelander (1974) found that 75% of all nest trees surveyed in 35 nest territories were within ¼ mile of a water body. The least distance from water was 50 yards and the greatest distance was 2-¼ miles (Graph II).

GRAPH II



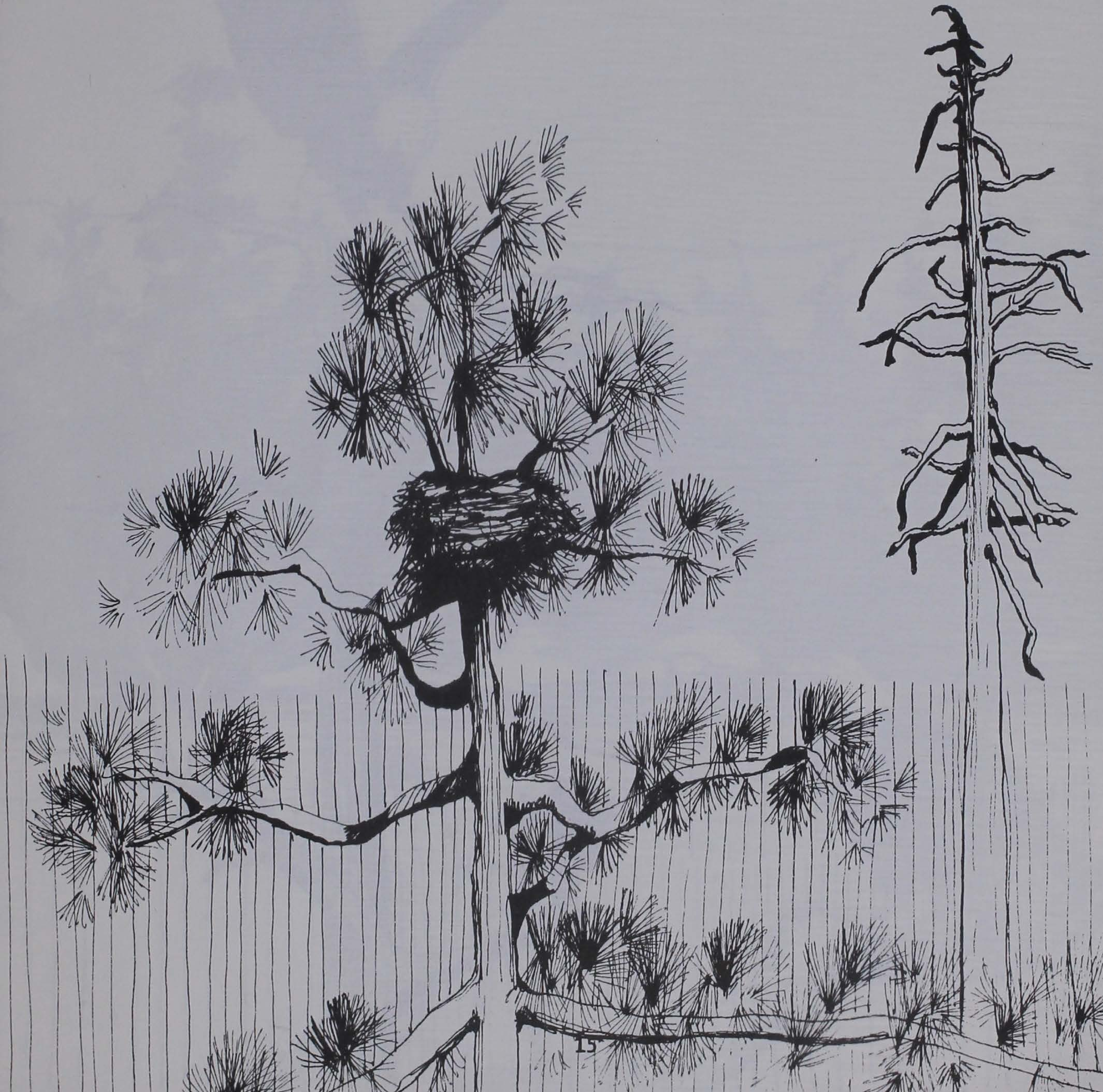
Thirty-Five Nests In California
Distance From Nearest Water (in miles)

In southeast Alaska it was found that all nests were located within 200 yards of salt water or along the course of major mainland rivers (Robards and King, 1966). A study conducted on the Alaskan Penninsula showed that all nests were within 50 yards of water (Hehnke, 1973).

Feeding areas and flight paths to and from the nesting territory will need to be considered in developing protection plans.

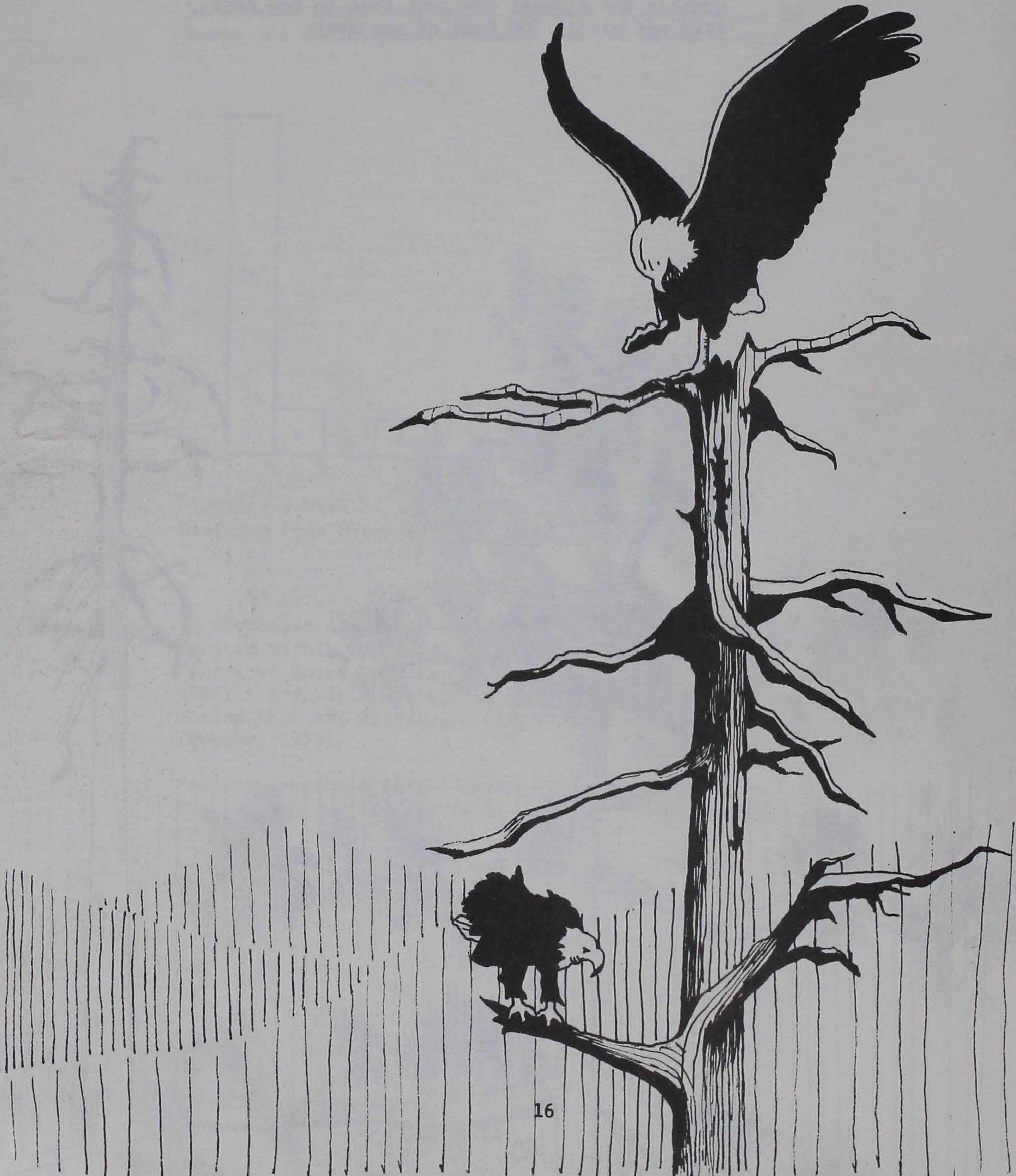
b. Pilot Tree.

The pilot tree is used as an access point to and from the nest. It is often in use by one of a pair when the mate occupies the nest. It is usually a hard snag with many lateral limbs for perching, but may also be a live tree. It is usually the closest dominant tree to the nest tree and within 100 feet of the nest.



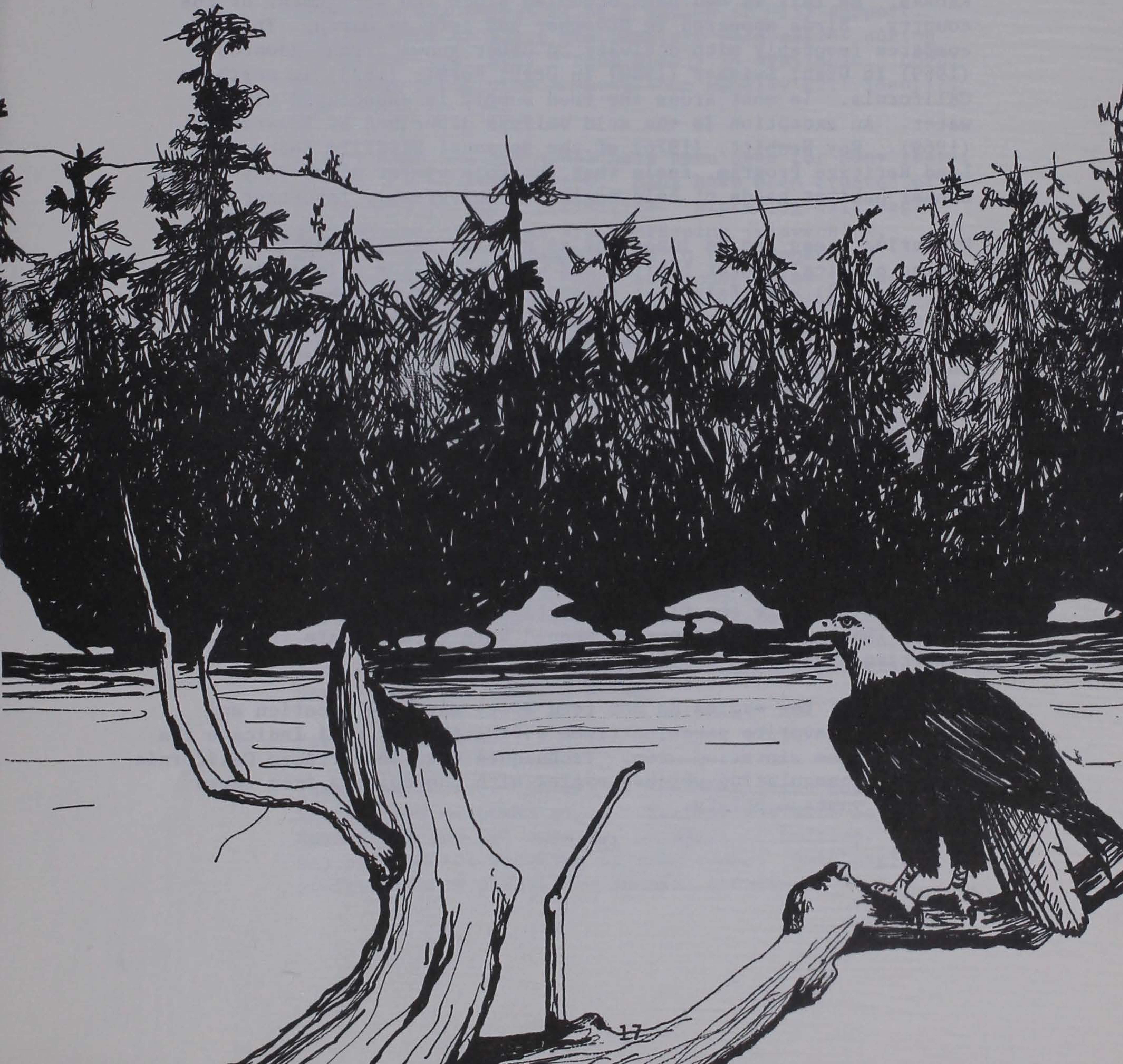
c. Perch Tree.

Distance between the nesting tree and perch trees often indicates the size of a nest territory. A perch tree can be a live spike top tree or a hard limby snag. These are often found along ridges.



d. Fishing Perch.

Fishing perches are sometimes found within the nesting territory or in close proximity. There is some question as to whether fishing perches are proper components of the defended nesting territory as are nest trees, pilot trees and perch trees. It is quite apparent that fishing perches must be maintained as an essential component in the process of obtaining food, regardless of this relationship to the nesting territory.



B. Winter Concentration Areas.

National Wildlife Refuges, under the management of the Fish and Wildlife Service, have long been used to determine the status and trend of Bald Eagle abundance. These are areas of logical Bald Eagle concentration around a food supply in the winter. There are, no doubt, many other smaller winter concentration areas also associated with a local winter food supply. Communal roosting by bald eagles near these winter feeding areas is thought to be consistent and predictable behavior. The subject has been lightly treated by research as evidenced by the limited literature.

Imler (1934) identified such a winter concentration near Stockton, Kansas. He felt it had been occupied since the settlement of the country. Birds appeared in November and left in March. This compares favorably with activity on other known areas--Edwards (1969) in Utah; Swisher (1960) in Utah; Forbis (1975) in northern California. In most areas the food supply is associated with water. An exception is the arid valleys described by Edwards (1969). Ray Nesbitt, (1976) of the National Wildlife Federation's Land Heritage Program, feels that the role winter areas play in the annual habitat needs of bald eagles is universally important.

Wintering areas are as important as nesting territories in providing critical winter habitat and well-being for bald eagles. Sprunt (1972) also felt that these wintering areas should be protected from encroachment by man's activities. Disturbance or destruction of wintering areas may affect reproductive potential through lowered vigor and increased stress. These wintering areas may contain the gene pools for bald eagles representing the total breeding population from several states. For instance, it is theorized that the area in northern California which serves over 500 birds represents a large percentage of the breeding population from California, Oregon, and Washington.

Location night communal roosting areas is the first step. Bald eagles seem to habitually leave night communal roosing areas at first light and return shortly before dark. Starting at the feeding areas note the flight direction in the mornings and evenings. These flight directions should help to delineate the total wintering area.

Since all of the eagles do not feed every day, the location and mapping of favorite perching trees during the day will indicate the extent of the wintering area. Techniques used in northern California include triangulating perched eagles with theodolites from three separate vantage points.

1. Components of Winter Concentration Areas.

a. Food Supply.

Most wintering bald eagles focus on waterfowl and fish as a main food supply. In some areas there is a switch in diet from fish during the breeding season to waterfowl during the winter. In other areas the year around diet is fish. Food habitat studies on bald eagles near waterfowl refuges show a forage species shift during and just after waterfowl hunting seasons (Imler and Kalmbach, 1955).

A winter food supply, however, may vary from waterfowl, fish killed at a power turbine, road killed rabbits or deer. The stability of a food supply every winter will determine the number of bald eagles it will support. The presence of adult and immature bald eagles during the winter indicates a food supply is available. Local knowledge along with observations usually will identify the source of food.

Some winter feeding areas have been used for many years; others are relatively new. Many have been created or influenced by man's activities. Wintering bald eagle populations in Kansas are increasing (Hlavachick, 1976). This is presumably due to the numbers of large reservoirs that have been constructed in the past 30 years. However Kansas may now be intercepting waterfowl and bald eagles which historically wintered further south. It is thought that bald eagles in the fall and winter move to the nearest winterlong food supply. This movement may be North, South, East or West. Characteristically bald eagles are quite mobile and individual birds may use more than one wintering area.

b. Travel Lanes or Flight Paths.

In situations where food supplies and roosts are historic the travel lanes to and from will be well defined. Conservation of energy, especially in northern wintering areas, is very important. Flight distance may vary depending on juxtaposition of the communal roosting site, perch trees and feeding areas.

c. Perching Trees.

These can be trees or may be man made structures such as fence posts or power poles. Perches are used primarily during the day for resting, preening or hunting. Perches may be used for roosting in some cases. Bald eagles prefer natural perches to manmade structures.

Edwards (1969) stratified bald eagle roosting area into valley and canyon sites. He noted that the valley or lowland roosts were used for perching during the day and were used as roosts in fair weather. He added that when the weather was severe the canyon roosts were used almost exclusively.

d. Roosting Areas.

These are areas which contain night communal roosting trees.

These trees are usually large enough to provide safety from any threat from the ground. They are typically the largest trees in a timber stand. The crown near the top must be open and have stout lateral limbs. Easy entry and exit is a must for manuverability of a seven foot wing span. This drawing illustrates a roost tree in northern California. The limbs on the East (right) side have been used so heavily that the needles are worn off.

In communal roosting areas it has been observed that intensive roosting use has killed lateral limbs especially on sunny and lee sides of large trees, in effect becoming a preferred roosting tree. The number and quality of these favorite roost trees determine the size and importance of the winter roost. In Northern California it has been noted that the size and extent of the roosting areas increases as the number of birds increase and available roosting trees are filled.

e. Topography of Wintering Area and Flight Paths.

To large soaring birds such as bald eagles, wind currents are very important. Ridges, large mountains and tall trees are instrumental in controlling wind conditions.

In many cases, especially in northern areas, bald Eagles roost in trees that are protected from chilling winds. This protection may be afforded by hills and ridges or by adjacent trees that cut the wind.

Roosts are also selected by eagles so they can take advantage of prevailing winds to facilitate travel to and from the roost area.

f. Isolation.

Isolation is an important habitat component. Bald eagle wintering areas are usually found where human disturbance is low. Because of its importance, however, we consider it to be a necessary component of every bald eagle use area.

C. Human Disturbance.

1. Spatial and Psychological Isolation.

Reaction to human intrusion is one element in defining need for territorial isolation. Effects of human presence on Bald Eagles are still being argued. The reality is probably that eagles will tolerate a degree of human presence or disturbance until it reaches a critical point (or threshold level).

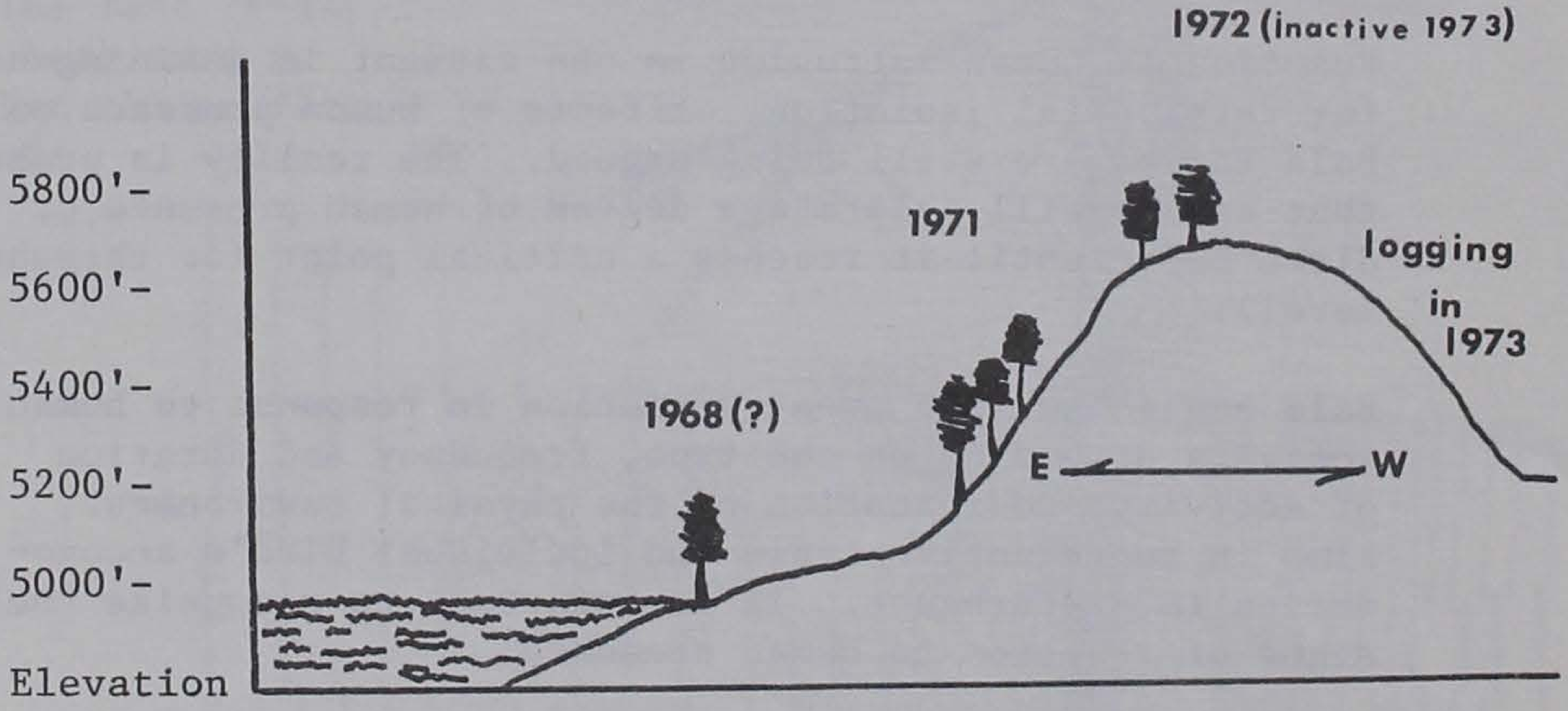
Bald eagles exhibit great variation in response to human activity depending on the type, frequency and duration of activity, modification of the physical environment, time in reproductive cycle and individual bird's accomodation to disturbance. It is important to recognize the signs of reaction to human presence.

DISTURBANCE INCREASING

1. No observable response.
2. Bird focuses on intrusion - turns head to observe.
3. Bird shifts body position, stands, lifts wings.
4. Vocal call, flying away from intrusion or at intrusion.
5. Alternate nest site construction away from direction of disturbance, usually upslope from lake or river while remaining in line with same vantage point in the subsequent season.
6. Frequent and consistent nesting failures or relocation of communal roosting site.
7. Abandonment of nesting territory or wintering area.

Disturbances are quantitative and cumulative. The effects must not only be measured in terms of presence or absence of adults, but on productivity. Mathisen's (1968) study on the Chippewa National Forest shows only 6% decrease in reproductive success in areas where humans associated were frequent, as compared to nests in isolated areas. He concludes that human activity was not seriously affecting bald eagle productivity at that time. Others contend that freedom from human disturbance is a habitat requirement. There is evidence that recent snowmobile activity may be effecting reproduction adversely. Evidence shows eagles have abandoned territories after a long history of occupancy only where present levels of the activity to which they have been accustomed is exceeded. The reaction may not be immediate; it may take several years before abandonment occurs. Abandonment is a process indicated by nest relocation, failure to breed, or failure to rear young. When no suitable nest sites are left in the territory, ultimate abandonment occurs. In California there has never been a case where a nest territory has been reestablished or reused after abandonment.

Thelander (1973) reports upslope nest relocation away from direction of disturbance. This demonstrates fidelity to the nesting territory in face of disturbance over selection of an entirely different location. Abandonment often follows if birds are unable to move upslope a sufficient distance from disturbing influences.



Diagramatic representation of the vertical trend in nesting site relocation over long periods of time at Lake Almanore; Plumas County (Thelander, 1973).

Another way of evaluating eagle reactions is proposed by Juenemann, et al, (1972) who rated the influence of some human activities on bald eagle nesting.

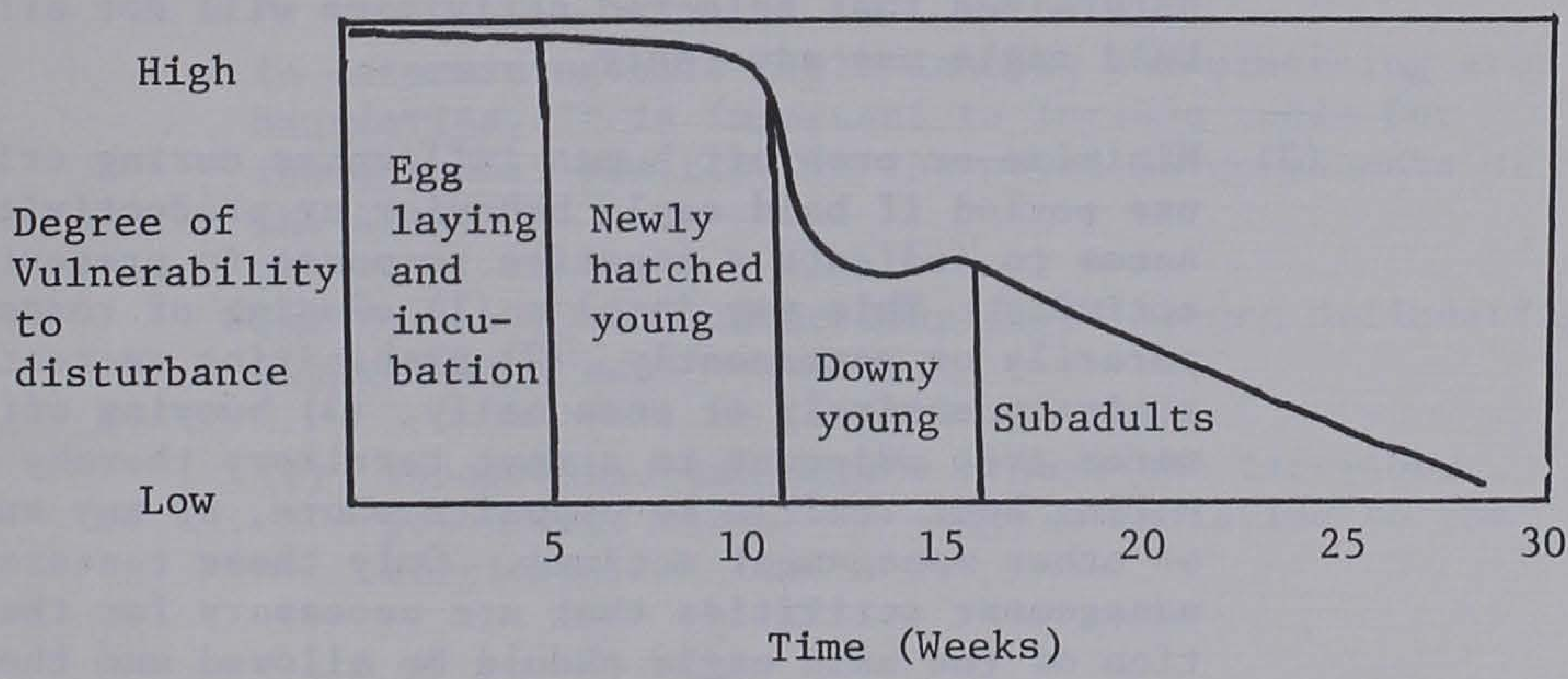
Rating*	Activity
Low (1)	Power and telephone lines, remote buildings, trails and abandoned logging roads, winter roads and developed plantations.
Moderate (2)	Railroad within one mile and one train per day, inactive or seldom used roads.
High (3)	Active roads (surfaced or nonsurfaced), logging in the area from November to March (out of nesting season), railroad with four trains per day.
Very High (4)	Medium to heavy recreational use (seasonal activity around resorts and campgrounds), construction of tree plantations, blasting, timbering activities between March and July.

It seems proper to assume that all bald eagles need some degree of isolation from disturbing activities so they will be allowed to carry out the necessary tasks required during critical times. The extent of this need for spatial and psychological isolation varies from case-to-case and cannot be generalized.

2. Critical Nesting Periods.

Most authorities agree that timing of disturbance in relation to eagles breeding chronology is important. Vulnerability is greatest during egg-laying, incubation, hatching and when eaglets are small and downy.

Vulnerability to Disturbances



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*Adjective ratings added by these authors. Original paper referred to numbered categories.

a. Egg Laying and Incubation Period.

This five week period of nesting activity is the most critical in terms of reproductive success. Disturbance at this time may cause the adults to leave eggs unattended. Interruption of incubation may cause heat loss to the point of nest failure. Precautions should be taken to minimize disturbance during egg laying and incubation.

b. Newly Hatched Young.

Unnatural exposure of young unnecessarily reduces the chances of survival, especially during periods of inclement weather. Interruption of feeding visits may also be a factor.

c. Downy Young.

There may be a period of 1 to 2 weeks prior to fledging when disturbance may cause young to leave nest prematurely.

D. Defining Habitat Management Zones.

1. Active Bald Eagle Use Areas.

Many biologists are using a primary and secondary zone concept which includes all of the necessary physical components of the nesting and wintering habitats. This includes the intangible component of spatial isolation as an integral part of bald eagle use areas.

a. Primary Management Zone.

The purpose is to define a management area where only those activities that promote optimum conditions for bald eagle use will be allowed. The following are suggested guidelines:

(1) Prohibit land use practices that will alter or eliminate existing habitat and hold disturbance to present level or reduce disturbance until study determines that selected activities will not affect bald eagle use adversely.

(2) Minimize or prohibit human influences during critical use period if bald eagle behavior or productivity data seems to indicate a negative response to present human activity. This may involve (1) closing of roads, temporarily or permanently, (2) prohibiting recreational activity entirely or seasonally, (3) buoying off a water area adjacent to a nest territory thereby channeling boat traffic to opposite shore, or any number of other management actions. Only those research or management activities that are necessary for the protection of the bald eagle should be allowed and those should be closely supervised by the responsible agency.

(3) Maintain or enhance components of bald eagle use areas such as managing trees in zone to provide roosts, nest trees, etc., for present and future needs.

b. Secondary Management Zones.

The purpose of a secondary zone is to:

(1) To provide a caution zone or buffer from major land alternations, e.g., construction of permanent high use facilities, etc., which might alter the integrity of the primary zone.

(2) Protect areas which are important to the bird outside of the primary protection zone, such as feeding areas.

(3) To encompass enough land to continue to provide required territory components in the same general area, i.e., future nest sites, fishing perches when present ones are no longer available.

(4) To compensate for inadequate knowlege on specific bald eagle habitat needs.

Examples of Recommendations in the Secondary Zone Are:

(1) Intermittent use, such as fishing, picknicking, mooring, camping, and other low level uses may be compatible, however, permanent land modifications such as permanent campgrounds, launch facilities, gravel pits, roads, etc., are probably not compatible.

(2) Select logging practices olutside of breeding season which have been coordinated with a wildlife biologist, but no timber activity during the breeding season.

In determining bald eagle nesting and wintering area boundaries, it is important to include needs for isolation in addition to the physical components of the area.

The following should be considered before delineating management areas:

(1) Topographic boundaries around the territory which lend visual or audible isolation to the territory.

(2) Retention of trees which lend visual isolation, to the use area or from surrounding activities and trees which protect from wind currents or other climatic elements. Trees may be the most important environmental feature in flat terrain in defining isolation boundaries.

(3) Disturbances in relation to the location of bald eagle use areas. Bald eagle tolerance is generally higher if human influences are downslope from a nest giving the bird an elevation vantage point. If disturbances are upslope of the nest, the birds may be less tolerant of the same disturbance. Consider individual breeding pair's response to types and different levels of human activity since threshold levels of tolerance to disturbance vary widely. This may be measured either behaviorally or through productivity levels. Productivity levels may serve as an indicator, although several other factors can effect productivity, such as pairs being beyond reproductive age, pesticides and lack of adequate food supply.

These primary and secondary delineations must be made on a case-by-case basis to fit specific local conditions and needs.

2. Abandoned Bald Eagle Nesting Areas.

Abandoned territories are those which have been active in the past, evidenced by record or nest remnants, which are not currently being used by eagles. These should be evaluated to determine the needs for protection, since they may be used as habitat for the continuation or expansion of eagle populations.

The secondary zone concept of allowing light use of the area or intermittent activities outside of the breeding season which do not alter the habitat may encourage eagle reuse. Abandoned territories should be checked each year, February - March, to see if they have become reoccupied.

The California Southern Bald Eagle Working Team has recommended that abandoned territories be evaluated every three years for need for continued protection. If the territory appears to have all the necessary components present, and is not occupied then further study is necessary to determine the limiting factor causing the abandonment. If the territory has been altered or significantly degraded by human activities or by natural phenomena, such as fire or windfall, protection may no longer be needed. For example, if an abandoned nest tree falls and there are no other dominate old growth trees for replacement in the area, it is unlikely the territory will become active until such trees exists. This information will assist in a decision to continue management of the territory for bald eagles.

III. SUMMARY.

In summary, this pamphlet offers a methodology for the establishment of critical habitat for Bald Eagles.

Situation: You suspect a bald eagle nesting or winter area, based on frequent sightings.

1. Plot sightings on map.
2. Do a field search of general use area indicated by maps.
3. Look for and identify habitat components based on seasonal use.
4. Delineate primary zone on map based on habitat components.
5. If a nesting territory, establish critical breeding periods. If a winter area, establish critical use period.
6. Establish recommendations for primary area, allowing only those activities that promote optimum conditions for habitat maintenance.
7. Based on primary zone and management direction establish a secondary zone.
8. Establish management directions for the secondary zone to meet the purposes outlined.
9. Coordinate information and management direction with other appropriate agencies and groups. The Southern Bald Eagle Working Team should review all plans for bald eagle use areas in California.
10. Write a comprehensive management plan for the area considering all land use activities.

APPENDIX A

I&E Plan and Signing

I&E Plan. (Information & Education)

The degree or probability of human impact should serve as the basis in the development of an I&E plan. The objective should be to avoid calling attention to eagle areas which are presently protected due to isolation or low human pressure, while increasing protection through public awareness in these eagle areas already impacted by human activity. Example: In one area I&E plan may not call for public awareness of a remote bald eagle roosting area, where protection and enforcement would be administratively difficult. However, at a popular boating lake, an I&E plan calls for public awareness of closure areas where recreationist may be frequently in conflict with bald eagle interests. An I&E plan may consist of a one page policy statement regarding endangered species, or may be a detailed plan.

An I&E plan may be divided into two areas; (1) efforts toward general public awareness of the Bald Eagle and its protected status, (2) efforts involved with management plans call for public restriction.

1. General Awareness of Bald Eagles. Since Snow (1973) reports that shooting is the major factor in direct loss of eagles, a general public awareness program can only be positive toward Bald Eagles protection.

Contact Sources and ideas for Awareness Programs.

1. Work with local agency responsible for a Hunter Safety program to incorporate protected species into the course.
2. Local Fish and Game or Fish and Wildlife wardens may be willing to speak at schools, local groups, concerning recognition and legal protection for endangered species.
3. Audubon or other Wildlife interest groups are willing to assist with or undertake endangered species awareness programs.
4. Local sporting goods stores are good places for dissemination of endangered species awareness material. A bald eagle poster with a brochure rack of handouts could focus interest.
5. Farm advisors or local County Agricultural Commissioners office are good contacts with local farmers concerning protection of bald eagles.

2. I&E in Conjunction with Management Plans. A general rule is to avoid locating specific eagle areas whenever possible. An exception to this is with small public groups assisting in development of land use plans involving the bald eagle. The local media can be helpful in explaining need for closures or other public restriction in bald eagle territories. An understanding should be made to refer to the general area only and to take photos in such a way to avoid pin pointing nests. There should be coordination with Fish & Game and Fish and Wildlife Services before initiating public information plan for endangered species.

Signing

Signing should be coordinated with State Fish & Game Departments and U. S. Fish and Wildlife Service, for concensus of need and when possible, sign restrictions or closures under regular agency signing, especially in remote, unprotected bald eagle areas. In high public use areas, signing may be accomplished in a general way.

Example: Shoreline signing of Shasta Lake, California adjacent to bald eagle and osprey territories.

CRITICAL WILDLIFE AREA
Moorage & Shoreline
Recreation Prohibited
for the next 1250 feet

U. S. Forest Service

In this case, the objective was to make the signs large enough to be seen from lake surface without walking up to the signs. Bald eagles at Shasta Lake are more tolerant of regular boat traffic than of human activity on the shoreline within their territory.

Signing at Shasta Lake was undertaken when it was determined that the threat of unintentional intrusion by recreationists on bald eagle territories was greater than the threat of increased attention to the area and any consequences thereof from the signing. Those territories which were farther from the shoreline or isolated in other ways, were not signed. Those signed were in locations of potential conflict with recreationists.

APPENDIX B

Searching, Finding and Reporting

Several methods have been devised to search for, locate and record bald eagle activity. Historically, interest in bald eagle activity has been generated by random sightings of bald eagles. This interest has usually been followed by a more or less systematic development of a data base on bald eagle locations and activity. Methodologies were developed on a trial basis and are suited to individual local conditions. Some are presented here only for information and to suggest some possibilies.

Historic sighting records is a good place to start in developing a data base. Some places to check are: State agencies, U. S. Fish and Wildlife Service, U. S. Forest Service, U. S. Bureau of Land Management, The Audubon Society and local birders. Assay of these sightings by season will usually suggest locations of historic use areas. Seasonality will suggest the major type of activity.

In southeast Alaska, Robards and King (1966) used the eagle nest data card to record sightings.

EAGLE NEST DATA CARD - BALD - GOLDEN

Observer's Name ____________________
Address ____________________
Transportation Used ________ Date ____________
Geographic Location of Nest ____________
____
____
Useable Landmark to Relocate Nest ____________
____
____

NESTING SITE
Merchantable Timber ____________
Tree Species ____________
Shrub Species ____________
Cliff or Other Location, Describe
____
____
Ht. from Ground ______ Sea Level ________

NEST ACTIVITY
No Activity ____________
Adults in Locality ____________
Active Nest Building ____________
Incubating Eggs ____________
Brooding Young ____________
Eggs in Nest, Number ____________
Young in Nest, Number ____________
Date of Hatch ____________
Date Young Left Nest ____________
Mortality Observed ____________
Cause of Mortality ____________

COMPLETE A DATA CARD FOR EACH OBSERVATION IF CHANGE IN NEST STATUS.

USE REVERSE SIDE FOR SUPPLEMENTAL DATA OR TO ADD NOTES ON ABOVE.

In Northern California, the Klamath National Forest uses this bald eagle observation form to record activity in, around and to and from a winter roosting area.

BALD EAGLE WINTER ROOSTING ACTIVITY REPORT

Observation Post #__________ Location ______________________________

Weather ____

Date ____________________ Start Time ____________________________

Sighting #_________________ Map Reference #_______________________

Sighting Direction/Location ______________________________________

Distance __________________________________ Flight Direction _______

Description of Bird ____

____

____

Remarks ____

____

Stop Time ____________

____

N

The Shasta-Trinity National Forest in Northern California developed a list of suggestions and nest record form for locating and recording bald eagle nest territories.

R5-2600-

ADMINISTRATIVELY CONFIDENTIAL BALD EAGLE - OSPREY NEST RECORD	Territory Name Nest Code Prepared By Date

State	County	Forest	District	Legal Description

LANDOWNERSHIP
☐ National Forest
☐ Other Fed. or State
☐ County, City, etc.
☐ Private
☐ Outside N.F. Boundary

NEST TREE
Species ___ DBH ___ MT. ___
Condition of Tree _________
Remarks:

NEST
Height ____ Apx. Size ______________
Date Constructed ______________
Accessibility:
☐ D ☐ M ☐ B2/
Visibility

NEST HABITAT
Timber type, size, & density ______________
Distance to open water (.1 mi.) ______________mi.
Dist. to lake-100 Ac. or larger (.5 mi.) _____mi.
Dist. to major river (.5 mi.) ______________mi.
Dist. to swamp (.1 mi.) ____mi. T.S.&D. _________
Nest trees available? ____ Apx. No. __________
Remarks:

DEVELOPMENT
Distance to nearest main road (.1 mi.) _____ mi.
Distance to Secondary road (.1 mi.) ________ mi.
Structural developments nearby ______________
☐ Wild ☐ Mod. Developed ☐ Well Developed
Timber cutting in area? ______________
T.S.I. Planting, etc? ______________
Remarks:

MANAGEMENT CONSIDERATIONS AND REMARKS:

MAP

SCALE -

PHOTOGRAPHY RECORD OF NEST TERRITORY

Suggestions:

1. Include general area surrounding the nest.
2. Skyline or landmarks will assist in relocation of nest sites.
3. Circle or indicate actual nest site in ink on the face of the photography.
4. Close-up of actual nest.

SUGGESTIONS FOR LOCATING AND RECORDING BALD EAGLES

Where to Look.

1. Bald eagles are usually located within several hundred yards of large bodies of water such as lakes, reservoirs, and major streams.

2. Eagles frequently establish their nest sites in areas covered with dense or scattered large, mature, Ponderosa and Douglas-fir trees.

3. Nests may be on ridges, but normally nest sites are selected below the tops of major ridges.

What to Look For!

a. Flying or perched adults and immature eagles.

b. Stick nests located 5 to 10 feet below the tops of large mature trees. Ponderosa pine and Douglas-fir trees are frequently selected. Usually the top of the tree will provide cover for the nest.

c. Boat surveys are probably the most effective and cheapest methods to search for eagle territories and nests. The boat should travel at low speeds, approximately 30 to 60 yards from shore. The observer should be in position to "skyline" the nest. Several passes may be necessary to satisfactorily cover the area.

d. *Helicopter and fixed-wing aircraft should be flown on days of excellent visibility, overcast days should be avoided. The survey should be conducted during the mid-portion of the day, or when the search area has direct sunlight. The adult birds are more inclined to be near their nest site during the middle portion of the day. The aircraft should be flown slowly throughout the area to be searched. Flushing birds and observing perched birds will draw attention to possible nest sites or territory. Once adults or immature birds are located, several passes, or a return trip on foot or boat, will probably be necessary to locate the nest site. Locating the actual nest sites by aircraft is not easily accomplished.

e. Ground searched from vehicles should be accomplished during early and late evening of the day when the birds are most active. Select observation points where large areas can be watched. The nest site would probably be impossible to observe. Watch for birds flying around in their territory, and to and from their nest site. Once a territory is located, closer inspection may reveal the nest site.

Reproductive Success Survey.

1. A survey to obtain clutch size would probably require the use of a helicopter. We do not recommend conducting this type of survey.

b. The fledged young can be readily determined by observing the nest from 100 to 400 yards, in the last weeks of May or early portions of June. The fledged birds are usually active, and can be easily observed and identified at long distances. This survey must be completed prior to the 3rd week in June. The young may begin to leave the nest by the last week in June, and young birds of the year could be missed.

c. *A helicopter can be employed to monitor reproduction efforts, however, the nest should not be approached closer than 200 yards. The observation pass should be quickly made, and the aircraft should immediately leave the area. No incidence of eagle aggression has been noted when surveying nest sites. However, ospreys will attack a helicopter in the vicinity of their nest site.

   The hazard of flushing a young bird from the nest must be considered when using a helicopter in counting the young or fledge birds.

Documentation and Reporting.

a. A Bald Eagle nest Record Sheet, should be completed for every known eagle stick nest. Annual surveys to determine th existence and activity should be made. Nest sites which have been abandoned should be checked until no remains of the nest is visible. A color photograph should be made to document conditions of the nest and surrounding area. The photograph record should include long distance general area photographs, plus close-up details of the nest and site.

b. The number of active and inactive nests and the annual nesting success should be reported to the Department of Fish and Game. A standard reporting form will be developed by the working team.

c. The loss of any nest or bird due to unnatural cause such as shooting, or other human activity should be reported immediately to the Department of Fish and Game and U. S. Fish and Wildlife Service.

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*Authors' footnote: Current information indicates that fixed wing reconnaissance is less disturbing to eagles than use of helicopters for data gathering.

APPENDIX C

Reporting Mortalities and Injuries

In and around areas of bald eagle activity, raptor mortalities and woundings warrant special attention.

In the case of a wounded bald eagle, the bird should be captured and officials of both the State Department of Fish and Game and the U.S.D.I. Fish and Wildlife Service should be notified. The birds are often sent to rehabilitation centers or used for captive breeding and propagation programs. Following is the current (November 1973) Fish and Wildlife Service policy on reporting and shipping of dead eagles and other raptors.

Policy on Reporting and Shipping of Dead Eagles and Other Raptorial Birds

A. Purpose.

Eagle and other aptor mortalities warrant special attention in determining probable cause of death since these losses may be related to environmental degradation, accidental poisoning or violations of State and Federal laws. They require special handling for evidentary purposes and the disposition of the carcasses is important from an enforcement standpoint since the bodies of these birds or parts thereof may be subsequently entered illegally into commerce. This establishes Bureau policy for reporting and shipping of eagles and other raptorial birds and assigns individual responsibilities to insure proper disposition of specimens.

B. Procedure for Reporting and Handling Dead Eagles and Other Raptors.

1. All Bureau employees will:

   (a) Record the time, date, place and circumstances where a specimen is found.

   (b) Preserve the specimen immediately by freezing.

   (c) Maintain personal possession of the specimen.

   (d) Notify the nearest Bureau Special Agent by the most expeditious means.

   (e) Follow instructions of the Special Agent which may include:

      1) Temporary retention of the specimen for the Special Agent.

      2) Shipping of the specimen to the Special Agent or a Bureau laboratory.

      3) Destruction or other disposition of the specimen.

2. Bureau Special Agents will:

(a) Determine if an investigation is warranted.

(b) Record the mortality for future reporting, as necessary.

(c) Conduct an immediate investigation if violation of State or Federal law is suspected.

(d) Determine if necropsy and/or tissue analyses is necessary for law enforcement purposes.

(e) Advise appropriate regional personnel interested in raptor mortalities.

(f) Ship or make appropriate arrangements for shipping of the specimen to a Bureau of other laboratory as warranted.

(g) Issue supplementary shipping instructions as necessary.

(h) Dispose of salvaged specimens as appropriate.

C. Bureau Laboratory Analysis.

1. Policy.

(a) All bald eagles, regardless of suspected cause of death, shall be forwarded to Patuxent Wildlife Research Center, unless otherwise instructed.

(b) Only those golden eagles and other raptors involved with law enforcement matters will be forwarded to Denver Wildlife Research Center for analyses, unless otherwise instructed. Those golden eagles and other raptors which are notinvolved with enforcement matters will not be sent to the Centers for analyses, but will be disposed of as provided in B1(4)3) or B2(h) above.

(c) Analysis of bald and golden eagles and other raptors for law enforcement purposes should be given immediate attention by the Center Director. If such attention cannot be given the specimen, the Center Director will notify the Special Agent conducting the investigation. Upon completion of the analysis the Center Director will advise the Regional Director and the sender of his findings, using the most rapid method of communication available.

2. Shipping Instructions.

(a) In all future cases as described above, concurrent with shipment of the carcasses to the laboratory, the sender will notify the Center Director of the suspect circumstances with concurrent notice to the appropriate Regional Director.

(b) Birds for analyses should be frozen as promptly as possible, prefereably with brain tissue intact, and should be kept frozen even during shipment.

(c) Birds should be packed in dry ice in cardboard containers with stryofoam.

(d) Shipments should be sent Air Express Collect on Monday, Tuesday or Wednesday and marked "To be converted to a Governent Bill of Lading upon arrival."

(e) At the time a specimen is shipped a telephone call should be made to the Center Director's Office giving details of shipping including: airport, airline, flight number and arrival time insofar as possible. Personnel from Patuxent will meet the shipment in Baltimore if it arrives during the work week.

(f) Information pertinent to a given specimen will be attached to the bird and will also be included in a letter confirming the shipment. Data should include species, date, location, collector's name, collector's number if a log is maintained, and anyother information that appears pertinent concerning the specimen or the area from which it comes. If the specimen is for law enforcement purposes, the data accompanying the shipment and the letter should be marked "Restricted".

(g) Bald Eagles Should be Shipped To:

Director
Patuxent Wildlife Research Center

c/o Air Express Agent
Baltimore-Washington International Airport
Baltimore, Maryland 21240
Telephone: 301-776-4880 ext. 212

(h) Golden Eagles and Other Raptors Should be Sent To:

Director
Denver Wildlife Research Center
c/o Air express Agent
Denver International Airport
Denver, Colorado 80225
Telephone: 303-234-2283

D. Analysis By Other Than Bureau Laboratories.

1. Policy.

Circumstances may warrant a priority analysis of a specimen for evidentary purposes. Due to the overcommitment of Bureau laboratory services, Center Directors may not be able to provide the priority necessary in some cases. When priority analysis is necessary for evidentary purposes, Special Agents are instructed to consult with the appropriate Center Director to determine Bureau capability for providing the service. If the Center Director cannot provide the priority necessary, he will advise the Special Agent to utilize an outside laboratory.

2. Shipping Instructions.

Special Agents will provide shipping instructions as required in individual cases.

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